

What is claimed is:

1. An image processing apparatus comprising:

a contour image generator for generating a contour image from an input image generated by reading, as a multi-valued image, print contents of printed matter into;

a contour adder for adding contours to said contour image by referring to a contour density distribution in said contour image to generate a contour added image; and

an image synthesizer for superimposing said input image and a smoothed image obtained by performing a smoothing process for said input image, by referring to said contour added image, to generate a synthesized image.

2. The image processing apparatus according to claim 1, wherein said contour image generator includes deletion means for deleting a contour pixel within said contour image, said contour pixel satisfying at least one condition wherein a contour level of said contour pixel is equal to or smaller than a first threshold value.

3. The image processing apparatus according to claim 2, wherein said first threshold value is a value for a contour level higher than a contour level caused by printing dots that result from printing and moire patterns that occur when the print contents are read into.

4. The image processing apparatus according to claim 1, wherein said contour adder includes determination means for scanning said contour image with a predetermined window and for determining whether a density of contour pixels in said predetermined window is equal to or greater than

a second threshold value.

5. The image processing apparatus according to claim 4, wherein said contour adder further comprises:

means for calculating an average value of contour levels of contour pixels in said predetermined window; and

change means for changing the contour level of a target pixel in said predetermined window to said average value if the density of the contour pixels in said predetermined window is equal to or greater than the second threshold value and the contour level of target pixel in said predetermined window is smaller than said average value.

6. The image processing apparatus according to claim 1, wherein said image synthesizer determines a superimposition ratio for a pixel value of a pixel in said input image and a pixel value of a corresponding pixel in said smoothed image by referring to the contour levels of respective pixels in said contour added image.

7. The image processing apparatus according to claim 6, wherein said superimposition ratio is determined by substituting said contour levels of said respective pixels in said contour added image into a predetermined function.

8. An image processing method comprising the steps of:

generating a contour image from an input image generated by reading, as a multi-valued image, print contents of printed matter into;

adding contours to said contour image by referring to a contour density distribution in said contour image and generating a contour added image; and

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superimposing said input image and a smoothed image obtained by performing a smoothing process for said input image, by referring to said contour added image, and generating a synthesized image.

9. The image processing method according to claim 8, wherein said generating step includes a step of deleting a contour pixel within said contour image, said contour pixel satisfying at least one condition wherein a contour level of said contour pixel is equal to or smaller than a first threshold value.

10. The image processing method according to claim 9, wherein said first threshold value is a value for a contour level higher than a contour level caused by printing dots that result from printing and moire patterns that occur when the print contents are read into.

11. The image processing method according to claim 8, wherein said adding step includes a step of scanning said contour image with a predetermined window, and determining whether a density of contour pixels in said predetermined window is equal to or greater than a second threshold value.

12. The image processing method according to claim 11, wherein said adding step further comprises the steps of:

calculating an average value of contour levels of contour pixels in said predetermined window; and

changing the contour level of a target pixel in said predetermined window to said average value if the density of the contour pixels in said predetermined window is equal to or greater than the second threshold value and the contour level of target pixel in said predetermined window is smaller than said average value.

13. The image processing method according to claim 8, wherein said synthesizing step comprises a step of determining a superimposition ratio of a pixel value of a pixel in said input image and a pixel value of a corresponding pixel in said smoothed image by referring to the contour levels of respective pixels in said contour added image.

14. A storage medium for storing an image processing program, said image processing program comprising the steps of:

generating a contour image from an input image generated by reading, as a multi-valued image, print contents of printed matter into;

adding contours to said contour image by referring to a contour density distribution in said contour image, and generating a contour added image; and

superimposing said input image and a smoothed image obtained by performing a smoothing process for said input image, by referring to said contour added image, and generating a synthesized image.

15. The storage medium according to claim 14, wherein said generating step includes a step of deleting a contour pixel within said contour image, said contour pixel satisfying at least one condition wherein a contour level of said contour pixel is equal to or smaller than a first threshold value.

16. The storage medium according to claim 15, wherein said first threshold value is a value for a contour level higher than a contour level caused by printing dots that result from printing and moire patterns that occur when the print contents are read into.

17. The storage medium according to claim 14, wherein said adding step includes a step of scanning said contour image with a predetermined

window, and determining whether a density of contour pixels in said predetermined window is equal to or greater than a second threshold value.

18. The storage medium according to claim 17, wherein said adding step further comprises the steps of:

calculating an average value of contour levels of contour pixels in said predetermined window; and

changing the contour level of a target pixel in said predetermined window to said average value if the density of the contour pixels in said predetermined window is equal to or greater than the second threshold value and the contour level of target pixel in said predetermined window is smaller than said average value.

19. The storage medium according to claim 14, wherein said synthesizing step comprises a step of determining a superimposition ratio for a pixel value of a pixel in said input image and a pixel value of a corresponding pixel in said smoothed image by referring to the contour levels of respective pixels in said contour added image.

20. The storage medium according to claim 19, wherein said superimposition ratio is determined by substituting said contour levels of said respective pixels in said contour added image into a predetermined function.